ROM, ROM, or fixed disk), or the program instructions could be stored remotely but transmittable to the unit **5** via a modem or other interface device (e.g., a communications adapter) connected to a network over a transmission medium. The transmission medium may be either a tangible medium (e.g., optical or analog communications lines) or a medium implemented using wireless techniques (e.g., microwave, infrared or other transmission schemes).

Those skilled in the art should also appreciate that the program instructions stored in the code memory can be compiled from a high level program written in a number of programming languages for use with many computer architectures or operating systems. For example, the high level program may be written in assembly language, while other versions may be written in a procedural programming language (e.g., "C") or an object oriented programming language (e.g., "C+'" or "JAVA").

Those skilled in the art should further appreciate that in some embodiments of the invention, the functionality of the processing unit **5** may be implemented as pre-programmed hardware or firmware elements (e.g., application specific integrated circuits (ASICs), Field Programmable Gate Array (FPGA), electrically erasable programmable read-only memories (EEPROMs), etc.), or other related components.

While specific embodiments of the present invention have been described and illustrated, it will be apparent to those skilled in the art that numerous modifications and variations can be made without departing from the scope of the invention as defined in the appended claims.

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CONCLUSION

The foregoing has constituted a description of specific embodiments showing how the invention may be applied and put into use. These embodiments are only exemplary. The invention in its broadest, and more specific aspects, is further described and defined in the claims which now follow.

These claims, and the language used therein, are to be understood in terms of the variants of the invention which have been described. They are not to be restricted to such variants, but are to be read as covering the full scope of the invention as is implicit within the invention and the disclosure that has been provided herein.

THE EMBODIMENT OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. An area tactile stimulation display device, or "area tactile display device", comprising a plurality of individual, unitary, tactile stimulation display devices,

each of said individual tactile stimulation display devices having a common base support and a plurality of individually actuatable, bendable, cantilevered arms mounted in line on said base support wherein:

a) each of said arms has skin engaging tip ends directed away from the base support for effecting tactile stimulation of a skin surface contacting such tip ends through deformation of the skin surface, and

b) the tip ends on each of said arms are independently displaceable, upon actuation, laterally to the line of said arms to positions that are out of alignment with the line of arms,

whereby said ends, upon displacement from their initial positions in the line of said arms, transfer a deforming force to skin surface contacted by such tip ends, tending to deform skin so contacted in a direction parallel to the skin surface and transversely to the line of arms

wherein said individual tactile stimulation display devices are arranged in first and second sub-arrays wherein respective member devices of the first and second sub-arrays are positioned to intersect with each other.

2. An area tactile display device as in claim **1** wherein said respective member devices of said first and second sub-arrays intersect with each other orthogonally.

3. An area tactile display device as in claim **1** comprising primary gaps respectively separating each of the cantilevered arms from neighboring cantilevered arms, such primary gaps extending from the position where such arms meet with the base to the respective tip ends of each of said arms, the second sub-arrays including a second set of secondary gaps extending partially through the base of each transducer device in the second sub-array, such secondary gaps being in line with the primary gaps of each transducer device in the second sub-array, whereby the first and second sub-arrays may be positioned to intersect with each other by inserting members of the second sub-arrays within the primary gaps of the first sub-array, with the secondary gaps embracing respective portions of the common base support of the first sub-array.

4. An area tactile display device as in claim **3** wherein the individual tactile stimulation display devices in each of the first and second sub-arrays each comprise:

a) two opposed, outer face surfaces that extend over the common base support and over the bendable cantilevered arms, and

b) piezoelectric bimorph bending plates contained within each bendable cantilevered arm by said respective outer face surfaces,

c) first and second outer conductive layers respectively forming part of the piezoelectric bimorph bending plate and extending generally over both of the two face surfaces of each of said cantilevered arms,

wherein the conductive layers of each bendable cantilevered arm are electrically isolated from the conductive layers of adjacent, neighboring cantilevered arms for individual electrical accuation of each of said cantilevered arms.

5. A tactile stimulation display transducer device having a common base support and a plurality of individually actuatable bendable cantilevered arms mounted in line on said base support wherein: